

REMARKS

Please reconsider the application in view of the following remarks.

Disposition of Claims

Prior to this response, the application included claims 1-109. Applicants have cancelled claims 1-28, 34, 46, 47, 49, 53, 59, 62, 100, 101, and 109. Examiner has rejected claims 29-33, 35-39, 43, 44, 66-78, 82-84, 100, 103, and 106-109. Applicants notes with appreciation that the Examiner has allowed claims 45, 48, 50-52, 54-58, 60, 61, 63-65, 85-99, 102, 104, and 105 for at least the reasons stated in the Office Action. Applicants acknowledge Examiner's indication that claims 40-42 and 79-81 would be allowable for at least the reasons stated in the Office Action if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Accordingly, claims 29-33, 35-39, 43, 44, 66-78, 82-84, 103, and 106-108 are presented for examination, with claims 29, 44, 45, 52, 102, 103, 104, and 106 being in independent form.

Rejections under 35 U.S.C. §112

Examiner rejected claims 33 and 35 as being indefinite under 35 U.S.C. §112, second paragraph. The Examiner states that a broad range together with a narrow range that falls within the broad range in the same claim is considered indefinite. See MPEP § 2173.05(c). Applicants point out that this rejection does not apply to a narrower range in a dependent claim. According to MPEP §2173.05(c), "While a single claim that includes both a broad and a narrower range may be indefinite, it is not improper under 35 U.S.C. §112, second paragraph, to present a dependent claim that sets forth a narrower range for an element than the range set forth in the claim from which it depends. For example, if claim 1 reads "A circuit wherein the resistance is 70-150 ohms." and claim 2 reads "The circuit of claim 1 wherein the resistance is 70-100 ohms.", then claim 2 should not be rejected as indefinite.

Similar to the example in MPEP §2173.05(c), dependent claims 33 and 35 narrow the broad range of independent claim 29, thus claims 33 and 35 should not be rejected as indefinite. Specifically, independent claim 29 recites the broad range of “a thickness between 1 micron and 150 microns,” and dependent claims 33 and 35 recite narrower ranges of “a thickness between 10 microns and 125 microns,” and “20 microns and 50 microns” respectively. Applicants respectfully request that the rejection under 35 U.S.C. §112 be withdrawn.

Rejections under 35 U.S.C. §§102, 103

The Office Action rejects claims 44, 66-72, 76-78, and 108 under 35 U.S.C. 102(e) as being anticipated by Shigemura. (U.S. Patent No. 6,361,151).

Independent Claim 44

The Examiner rejected independent claim 44 as anticipated under 35 U.S.C. §102 by Shigemura. Applicants respectfully submit that Shigemura fails to disclose “A method of manufacturing an ink jet printing module comprising providing a thermoplastic bonding component having a plurality of openings, contacting the thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module....” The thermoplastic adhesive in Shigemura does not have openings when the thermoplastic adhesive contacts the nozzle plate. Rather, Shigemura describes gluing a nozzle plate 7 to a piezoelectric body 11 by applying a thermoplastic adhesive to one side of the nozzle plate 7. (Shigemura, col. 7, lines 14-16) Once the nozzle plate 7 is glued to the body 11, nozzles are formed through excimer laser processing on the nozzle plate 7 and into the ink channels of body 11 thereafter. (Shigemura, col. 7, lines 5-9) Thus, the thermoplastic adhesive does not have a plurality of openings when contacting either the nozzle plate 7 or body 11.

Accordingly, applicants submit that claim 44 is not anticipated and respectfully request that the rejection under 35 U.S.C. 102(e) be withdrawn. Furthermore, because claims 66-72, 76-78, and 108 depend from claim 44, these dependent claims are not anticipated for at least the same reason that independent claim 44 is not anticipated.

The Examiner also rejected dependent claims 73-75 as being unpatentable over Shigemura in view of Moynihan et al (U.S. 6,755,511), and claims 82-84 as being unpatentable over Shigemura in view of DeYoung et al (U.S. 4,751,774). The Examiner acknowledges that Shigemura fails to disclose that the thermoplastic bonding component has a thickness between 1 micron and 150 microns, between 10 microns and 125 microns, and between 20 microns and 50 microns. The Examiner also acknowledges that Shigemura does not disclose adhering a protector strip over the orifice plate and a thermoplastic bonding material adjacent to the protector strip or orifice plate. However, Applicants submit that both Moynihan and DeYoung fail to disclose the feature lacking in Shigemura. Specifically, Moynihan and DeYoung do not disclose contacting the thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module.

Accordingly, applicants submit that claim 73-75 and 82-84 are not obvious and respectfully requests that the rejection under 35 U.S.C. 103 be withdrawn.

Independent Claim 29, 103, and 106

The Examiner also rejected independent claims 29, 103, and 106 as being unpatentable under 35 U.S.C. §103 over Shigemura in view of Moynihan et al (U.S. 6,755,511). The Examiner acknowledges that Shigemura fails to disclose a thermoplastic bonding component having...a thickness between 1 micron and 150 microns as recited in claim 29, and the thermoplastic bonding component has a thickness between 20 micron and 50 microns as recited in claims 103 and 106. The Examiner cites Moynihan as disclosing this feature. Applicants respectfully submit that Moynihan fails to disclose or suggest a thermoplastic bonding component, rather Moynihan describes an epoxy layer.

The Examiner's position is that the epoxy layer is similar to the thermoplastic bonding component in the sense that they are both thermo-bonding materials. (Office Action, p. 12) However, thermoplastic materials are different from liquid adhesives, such as epoxy. For example, the properties of the epoxy in Moynihan teach away from the properties of the thermoplastic bonding component described in Applicants' application. Specifically, the epoxy

described in Moynihan flows easily, such that when parts are pressed together the epoxy can be squeezed from the bond lines into the pumping chambers. (Moynihan, col. 2, lines 59-61)

Unlike epoxy, the thermoplastic bonding component was chosen because it does not flow easily. Applicants explain that the thermoplastic material flows little during the bonding process, so that adhesive layers of as much as 50 microns have been employed. Because the thermoplastic bonding component does not include a liquid adhesive, the bonding process does not fill small passageways in the module. (Application, p. 4, lines 4-9) The thermoplastic bonding component can eliminate the need to apply a liquid adhesive precisely in a thin layer to bond components together. (Application, p. 4, lines 9-11) A person of ordinary skill in the art would not combine Moynihan (a liquid adhesive reference) with Shigemura to obtain a thermoplastic bonding component having...a thickness between 1 micron and 150 microns, or between 20 microns and 50 microns.

Furthermore, with respect to claims 103 and 106, Moynihan not only fails to disclose or suggest a thermoplastic bonding component, Moynihan fails to disclose the thermoplastic bonding component has a thickness between 20 microns and 50 microns. Rather, Moynihan describes a thin epoxy layer with a thickness between 0 and 15 microns. The Examiner states that Moynihan suggests that the thickness can be greater than 15 microns depending on surface variations. (Office Action, p. 12; Moynihan, col. 6, lines 3-5) However, Moynihan specifically states that the thickness has a range of 0 to 15 microns. (Moynihan, col. 6, lines 1-2). Moynihan explains that the epoxy thickness must be zero in areas where electrical connections must be made, and the thickness may vary in other places due to surface variations of the flex print and piezoelectric element. (Moynihan, col. 6, lines 2-7) Moynihan does not indicate that the thickness can be greater than 15 microns, rather Moynihan explains that depending on surface variations, the thickness may vary between 0 and 15 microns.

Accordingly, applicants submit that claims 29, 103 and 106 are not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn. Since claims 30-33, 35-43, and 107 depend from claim 29, these dependent claims are not obvious for at least the same reason that independent claim 29 is not obvious.

The Examiner rejected dependent claim 43 as being unpatentable over Shigemura in view of Moynihan in further view of DeYoung et al (U.S. 4,751,774). The Examiner acknowledges that Shigemura in view of Moynihan fail to disclose a protector strip adhered to the orifice plate. However, Applicants submit DeYoung fails to disclose the feature lacking in Shigemura and Moynihan. Specifically, DeYoung does not disclose "a thermoplastic bonding component having...a thickness between 1 micron and 150 microns."

Accordingly, applicants submit that claim 43 is not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn.

Conclusion

No fee is believed to be due. Please apply any charges or credits to deposit account 06 1050, referencing Attorney Docket Number 09991-014001.

Respectfully submitted,

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